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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/931,125	09/16/1997	HAE-SEUNG LEE	P54508	3842

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ROBERT E BUSHNELL
1522 K STREET, N.W. SUITE 300
WASHINGTON, DC 200051202

EXAMINER

PORTKA, GARY J

ART UNIT	PAPER NUMBER
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2188

DATE MAILED: 02/25/2004

49

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

08/931,125

Applicant(s)

LEE, HAE-SEUNG

Examiner

Gary J Portka

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3-6 is/are allowed.
- 6) ☒ Claim(s) 7-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114 was filed in this application after a decision by the Board of Patent Appeals and Interferences, but before the filing of a Notice of Appeal to the Court of Appeals for the Federal Circuit or the commencement of a civil action. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on January 26, 2004 has been entered.

2. Claims 1 and 2 have been canceled, claims 3, 6, and 7 have been amended, and claims 9-11 have been added by Applicants amendment. Claims 3-11 are pending.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 9-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 9 recites the limitation "most readily accessible region". This is vague and indefinite because it is not clear (and Applicant's specification does not otherwise provide antecedent basis for, see 37 CFR 1.75(d)(1)), what constitutes a "most readily accessible region". For example, it might be considered to be simply a current location of a read/write head; it might also be

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considered the mid-point between inner and outer cylinders, since this location would statistically have the lowest average seek latency from any given head position. Since the language does not establish the metes and bounds intended to be covered, the claim and claims 10 and 11 which incorporate it's limitations by dependency are rejected.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 7-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Jones, U.S. Patent 5,572,660.

7. As to claim 7, Jones discloses the method for writing and reading a RAID 5 as recited, the step for reducing overhead during read of data for recovery to improve data I/O performance met by the functionally equivalent elements performing the steps described previously with regard to claims 1-2 and 6. Applicant's own specification at page 6 lines 16-20 describes that two time reading and writing of disk drives is required when updating data with parity, which results in a large overhead. Jones therefore teaches a step for reducing overhead during a read for data recovery by avoiding the need to access the disk two times when the required data is in a cache.

The added limitation regarding parity being stored sequentially from the most outer cylinder is irrelevant because it was added to the preamble of a Jepson claim, it is to be treated as the remainder of the preamble previously was, that is, as admitted prior art (see MPEP 2129). If Applicant does not intend for this limitation to be construed as admitted prior art, the added limitation should be moved to be after the "improvement comprising" wording.

8. As to claim 8, Jones discloses the coupled controller, caches, and disks, and that the caches store data recovery information, as described above with regard to claims 1-2 and 6. The determining of information needed for recovery in a disk by using information for data recovery stored in the corresponding cache is described at Figure 3F item 390 and column 9 line 16 equation (in Figure 3D, a cache hit in the write back cache at 344 means that old parity is in the cache, which is read to perform the calculation at 390 of Figure 3F).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones, U.S. Patent 5,572,660, in view of Kakuta, U.S. Patent 5,583,876.

11. As to claim 9, Jones discloses a redundant memory system comprising: a plurality of defect-adaptive devices disposed in a RAID (214-1 through 214-8) as

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claimed having a first region storing information needed for data recovery (parity), and a second region storing data (see Figure 2D, and column 10 lines 7-18); plurality of caches (254-1 through 254-8) respectively coupled to the devices, each for storing parity information blocks needed for data recovery for the corresponding device (see Figure 2D, and column 10 lines 15-26); controller (210) coupled to each device and cache, with means for selectively controlling writing, reading, and obtaining of parity information to/from each memory device, and storing parity information obtained from a device in a corresponding cache (see Figure 3E, column 2 line 62 through column 4 line 6, in particular column 3 lines 30-39; column 10 lines 15-26, and column 11 line 55 to column 12 line 13).

Jones does not disclose that the parity is sequentially stored to a most readily accessible region of the memory devices. However, in an analogous RAID system Kakuta teaches a means to reduce overhead in updating error correcting codes during a write process by writing them in order to a disk (see Kakuta col. 3 lines 22-45, col. 7 lines 41-45, col. 8 lines 23-35, and col. 8 line 66 to col. 9 line 6); it is noted that this equates to a most readily accessible region to the extent claimed, since the code is written sequentially in the order in the direction of rotation of the disk, and that the method specifically completes the parity write within a single turn of the drive. It is further noted that the method applies to a distributed parity system such as in Jones (see Kakuta col. 12 lines 21-28). Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to sequentially store the parity in a most

accessible region of the memory devices, because this was a known means of reducing the parity update overhead in a write process.

12. As to claim 10, the teachings of Kakuta include that the first region comprises a most outer cylinder (see Fig. 10 and col. 12 lines 21-28; region D4 is shown at and thus comprises the most outer cylinder).

13. As to claim 11, Jones selectively obtains parity from the drives, and selectively stores parity obtained in a corresponding cache (Fig. 3E)

Allowable Subject Matter

14. Claims 3-6 are allowed.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Patent No:

5,737,741 Disk array with parity stored at radially inward part of each disk.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary J Portka whose telephone number is (703) 305-4033. The examiner can normally be reached on M-F 9:30 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (703) 306-2903. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gary J Portka
Primary Examiner
Art Unit 2188

February 23, 2004

